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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,739	10/30/2003	Binh Vo	015114-068400US	3284

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EXAMINER	
NGUYEN, STEVE N	

ART UNIT	PAPER NUMBER
2138	

DATE MAILED: 05/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/698,739	VO ET AL.	
	Examiner	Art Unit	
	Steve Nguyen	2138	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 are currently pending and have been examined.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 9, and 15 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites the limitation, "generating new test patterns including new test paths for the subset of the routing resources that occurred most frequently in the failed test paths". The applicant has not provided any disclosure of new test paths included in the new test patterns in the specification to enable one of ordinary skill in the art to make and use the invention. In fact, the only mention of new test paths is on page 5, paragraph 33, discussing the creation of patterns using a background configuration file.

The above similarly applies to claims 9, 15, and depending claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 9, and 15 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation, "generating new test patterns including new test paths for the subset of the routing resources that occurred most frequently in the failed test paths". It is unclear how the new test paths can be included in the new test patterns. A test pattern is comprised of digital data that is introduced into the circuit. A test path is a physical connection that carries digital data. Therefore it is not apparent how the new test paths can be included in the new test patterns as claimed.

The above similarly applies to claims 9, 15, and depending claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Mortensen (US Pat. 6,772,402) in view of Abramovici et al (US Pat. 6,966,020; hereinafter referred to as Abramovici).

As per claim 1:

Mortensen teaches a method for isolating failed routing resources on a programmable integrated circuit, the method comprising:

- receiving a set of failed test patterns that generated erroneous results when applied to a set of failed test paths (col. 7, lines 28-33), the failed test paths connecting together routing resources on the programmable integrated circuit (Fig. 2);
- identifying a subset of the routing resources that occur most frequently in the failed test paths (col. 8, lines 5-11).

Not explicitly disclosed by Mortensen is generating new test patterns including new test paths for the subset of the routing resources that occurred most frequently in the failed test paths. However, Abramovici in an analogous art teaches applying test patterns to isolated subsets of failed paths including faulty routing resources (col. 3, lines 9-12).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use test patterns to determine failed paths. This

modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that test patterns must necessarily be applied to the failed paths after grouping related failing paths as disclosed by Mortensen in col. 2, lines 56-61.

As per claim 2:

Abramovici further teaches the method according to claim 1 further comprising: testing the new test patterns using a test system to isolate routing resources among the subset of the routing resources that caused the erroneous results in the failed test patterns (col. 3, lines 9-12).

As per claim 3:

Mortensen further teaches the method according to claim 1 wherein generating the new test patterns for the subset of the routing resources further comprises: generating new test patterns for new test paths that route through every combination of fan-in resources and fan-out resources that are programmably connectable to each of the subset of the routing resources (test patterns are generated for all paths as shown in Figs. 1 and 2).

As per claim 4:

Mortensen further teaches the method according to claim 1 wherein generating the new test patterns for the subset of the routing resources further comprises: generating new test patterns for test paths that route through clock and clear signal routing resources (Mortensen generates test patterns for any test paths that are faulty).

As per claim 5:

Mortensen further teaches the method according to claim 1 wherein each of the failed test paths and the new test paths connect a control point to an observation point on the programmable integrated circuit (Fig. 1).

As per claim 6:

Mortensen further teaches the method according to claim 1 above wherein the routing resources have more than 1000 times as many routing resources as the subset of routing resources (Mortensen teaches that there may be several thousand failing paths in col. 3, lines 49-50, so therefore the subset of Mortensen would have more than 1000 times as many routing resources as the subset of routing resources).

As per claim 7:

Mortensen further teaches the method according to claim 5 above further comprising: receiving a test log file that indicates the observation points for the failed test paths (col. 7, lines 28-31; the path list includes all observation points of Fig. 1).

As per claims 8 and 20:

Mortensen and Abramovici teach the method according to claim 1 above. Not explicitly disclosed is wherein identifying the subset of the routing resources that occur most frequently in the failed test paths further comprises: extracting the routing resources that are connected along each of the failed test paths using a connectivity graph. However, it would have been obvious to one of ordinary skill in the art to do so because Mortensen teaches creating a node pattern for the most frequently occurring failed path that includes the routing resources that are connected along each of the failed paths (col. 10, lines 8-9).

As per claim 9:

Mortensen teaches a computer program product encoded on a computer readable medium for isolating failed routing resources on a programmable integrated circuit, the computer readable medium comprising:

- code for receiving a set of failed test patterns generating erroneous results when applied to a set of failed test paths (col. 7, lines 28-33) that connect together routing resources on the programmable integrated circuit (Fig. 2) and identifying a subset of the routing resources that occur most frequently in the failed test paths (col. 8, lines 5-11).

Not explicitly disclosed by Mortensen is code for generating new test patterns including new test paths for the subset of the routing resources that occurred most frequently in the failed test paths. However, Abramovici in an analogous art teaches applying test patterns to isolated subsets of failed paths including faulty routing resources (col. 3, lines 9-12).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use test patterns to determine failed paths. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that test patterns must necessarily be applied to the failed paths after grouping related failing paths as disclosed by Mortensen in col. 2, lines 56-61.

As per claims 10 and 16:

Mortensen further teaches the computer program product of claim 9 wherein the code for receiving and identifying further comprises: code for receiving a test log file that indicates observation points for the failed test paths (col. 7, lines 28-31; the path list includes all observation points of Fig. 1).

As per claim 11:

Mortensen further teaches the computer program product of claim 9 wherein the code for generating further comprises: code for generating new test patterns for test paths that route through clock and clear signal routing resources (Mortensen generates test patterns for any test paths that are faulty).

As per claims 12 and 17:

Abramovici further teaches the computer program product of claim 9 further comprising: code for testing the new test patterns to isolate routing resources among the subset that caused the erroneous results in the failed test patterns (col. 3, lines 9-12).

As per claims 13 and 18:

Mortensen further teaches the computer program product of claim 9 wherein the code for generating further comprises: code for generating new test patterns that route through every combination of fan-in resources and fan-out resources that are programmably connectable to each of the subset of the routing resources (test patterns are generated for all paths as shown in Figs. 1 and 2).

As per claims 14 and 19:

Mortensen further teaches the computer program product of claim 9 wherein the routing resources have more than 10,000 times as many routing resources as the subset of the routing resources (col. 9, lines 41-44).

As per claim 15:

Mortensen teaches a computer system for isolating failed routing resources on a programmable integrated circuit, the computer system comprising:

- a statistical failure isolation (SFI) tool that identifies a subset of routing resources that occur most frequently in failed test paths (col. 8, lines 5-11), wherein the SFI tool receives a set of failed test patterns that generated erroneous results when applied to the failed test paths (col. 7, lines 28-33), the failed test paths connecting together the routing resources on the programmable integrated circuit (Fig. 2).

Not explicitly disclosed by Mortensen is an adaptive failure isolation (AFI) tool that generates new test patterns including new test paths for the subset of the routing resources that occurred most frequently in the failed test paths. However, Abramovici in an analogous art teaches applying test patterns to isolated subsets of failed paths including faulty routing resources (col. 3, lines 9-12).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use test patterns to determine failed paths. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that

test patterns must necessarily be applied to the failed paths after grouping related failing paths as disclosed by Mortensen in col. 2, lines 56-61.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steve Nguyen whose telephone number is (571) 272-7214. The examiner can normally be reached on M-F, 9am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steve Nguyen
Examiner
Art Unit 2138

GUY LAMARRE
PRIMARY EXAMINER